UNITED STATES DEPARTMENT OF AGRICULTURE
Weather Bureau
Washington

Office of the Chief

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CIRCULAR

INSTRUCTIONS FOR CHARACTERIZING BAROMETRIC TENDENCIES

The following instructions are issued as an amplification of Section 35 of the instructions contained in the "1936 Weather Code" regarding the characterization of barometric tendencies.

For reference, the table contained in this section, together with a schematic representation of its contents, is given herewith as follows:

Designation of tendency	Schematic Representation	Characteristic of barometric tendency	
(1)		Rising then falling	
B		Rising then steady; or rising then rising more slowly	Barometer now higher than or same as 3 hours ago.
D		Unsteady	
F		Steady or rising	
G		Falling or steady, then rising; or rising then rising more quickly.	
M		Falling then rising	
N		Falling then steady; or falling then falling more slowly	Barometer now lower than 3 hours ago.
R		Unsteady	
S		Falling	
T		Steady, or rising then falling; or falling then falling more quickly.	

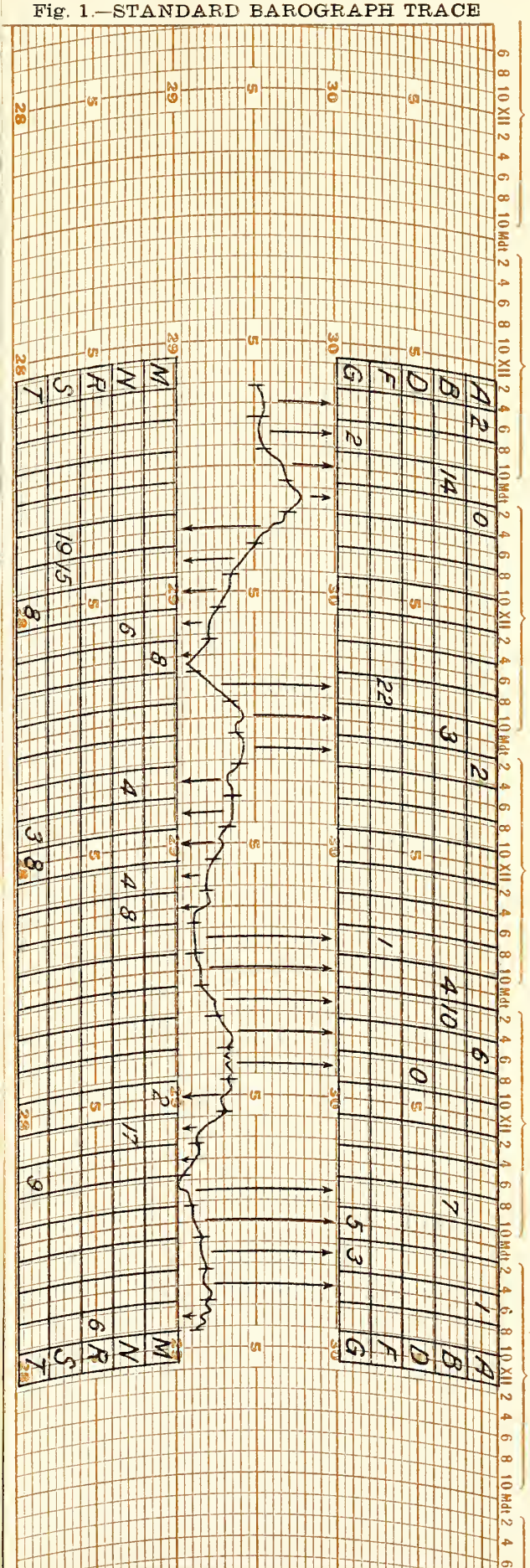
(1) The characteristic "rising then falling" is indicated in encoded Weather Bureau reports by the absence of a

Fig. 1

FORM NO. 1068—MET'L.

Pen arm is 182 mm. long; axis 39 mm. above clock flange.

Fig. 1.—STANDARD BAROGRAPH TRACE



consonant, the word beginning with A, E, I, O, or U. In the case of teletype reports, this characteristic is indicated by the use of the letter A. It is referred to as the A characteristic in what follows.

The following changes in this section as compared with the corresponding section in the "1931 Weather Code" will be noted:

1. The characteristic "B" includes a "Rising, then rising more slowly" tendency, as well as the "Rising, then steady" tendency hitherto used.

2. The "G" characteristic includes the tendency "Rising, then rising more quickly", as well as the "Falling, or steady, then rising" tendency used previously.

3. The "N" characteristic includes a "Falling, then falling more slowly" tendency, in addition to the "Falling then steady" tendency hitherto used.

4. The "T" characteristic contains the tendency "Falling, then falling more quickly", in addition to the tendency "Steady, or rising, then falling", in use previously.

To illustrate the proper methods to be used in classifying various trace segments, Figure I is given. In this figure, the trace is divided into three-hour segments. The way in which any particular segment is to be characterized is shown by the position in the column of a figure denoting the magnitude of the three-hour pressure change. If the segment is to be classified as a "B" characteristic, the figure giving the magnitude of the pressure change is placed in the "B" row. Thus, the first segment on the left hand side is classified as a an "A" characteristic, the second is classified as a "G" characteristic, etc.

The classifications given in this figure have been made in accordance with the following two rules which are to be adhered to by all observers from the date of receipt of this circular.

1. "D" and "R" characteristics are to be used only for those three-hour segments of the

trace which contain at least two crests or two troughs [1]* - these crests or troughs being pronounced to such an extent that there are points on them which lie at a distance from the mean slope of the trace [2], which is greater than the distance representing 0.02 inch on the barograph sheet.

2. If the three-hour trace segment does not have enough sufficiently pronounced crests or troughs to be classified as having a "D" or "R" characteristic, and if there is doubt as to which of the other characteristics should be used, the characteristic chosen should, in all cases, be that which is compatible with the net three-hour change and with the latter portion of the trace.

In the figure given above, the following characterizations illustrate the application of these rules:

1. The first "S" characteristic. Here there are two crests. However, the second crest is not sufficiently pronounced to contain points which lie at a distance from the mean slope of the trace greater than the distance representing a pressure difference of 0.02 in. and the trace is thus said to be merely a "Falling" one.

2. The second "B" characteristic. Here there is only one crest and it cannot, therefore, be classified as being unsteady. Since the latter part of the trace is steady, it is then characterized as being a "Rising, then steady" trace.

3. The second "N" characteristic. Here, again, the latter part of the trace is steady, and the characteristic to be chosen is, consequently, the "Falling, then steady" one.

4. The third "T" characteristic. In this case, the first part of the segment is disregarded in accordance with the second rule given above, and the trace is said to be a "Rising, then falling" one.

5. The fourth "N" characteristic. Again, disregarding the first part of the trace, the trace is this time classified as a "Falling, then falling more slowly" one.

*Numbers above an inverted carat refer to notes given at the end of the circular.

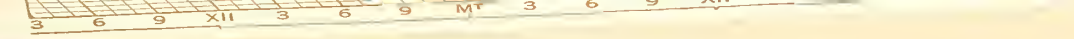

3 6 9 XII 3 6 9 M 3 6 9

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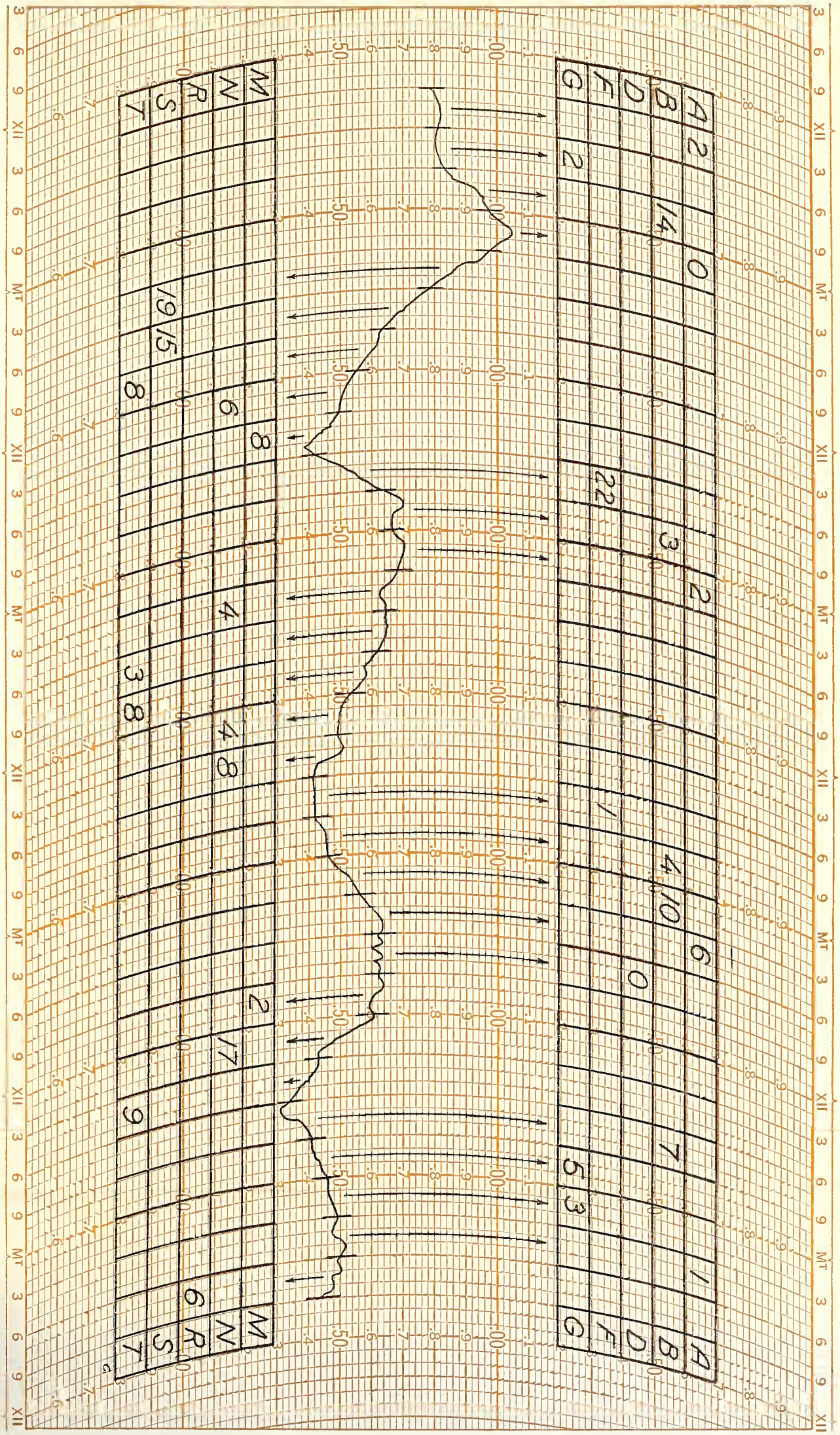
Fig. 2.—OPEN SCALE BAROGRAPH TRACE

BAROGRAPH

Open scale, 4-day, lowest line half inch

Pen arm is 7.625 inches long; axis 3.375 inches above clock flange

(MAKE NO NOTATIONS ON THIS MARGIN, WHICH IS RESERVED FOR BINDING)



PLACE THIS MARGIN UNDER THE BRONZE BAR

6. The second "M" characteristic. Since the pressure has not yet started dropping at the end of the trace segment, no crest can be said to exist there and a "Falling then rising" classification must be made.

7. The fifth "B" characteristic. In this case, the falling off of the rate of rise in the latter part of the trace is regarded as being sufficiently pronounced to justify giving it a "Rising, then rising more slowly" characteristic.[3]

8. The last "A" characteristic. In this case, the trace must be designated as a "Rising then falling" one, the first part of it being disregarded, in accordance with the second rule given above.

In case the pressure tendency is taken from an open-scale barograph, an effort should be made to characterize the pressure behavior in the same way that it would have been characterized had it been registered by an ordinary barograph. Accordingly, no attention should be paid to variations from the mean slope of the trace of less than 1/40 inch (which distance corresponds to a pressure difference of 0.01 inch on the chart).[4]

To make clear the type of variations to be disregarded in the case of an open-scale barograph record, Figure II is given. Before constructing this figure, the simultaneous records made by an ordinary barograph and an open-scale barograph at the same location were compared. The trace shown was then drawn to agree with the trace given in Figure I, except for minor variations, which are typical of the disagreements found in the above comparison. As outstanding examples of these variations, the observer's attention is called to the following trace segments: the first "B" characteristic, the second "S" characteristic, the first "M" characteristic, the second "T" characteristic, the second "F" characteristic, the fourth "A" characteristic, the fourth "T" characteristic, and the second "G" characteristic.

NOTES

[1] The crests of a trace are here defined to be either:

(a) those points at which the pressure ceases to rise and begins to fall,

or

(b) those points at which the pressure starts falling more rapidly - provided that a point at which the pressure begins to fall more slowly exists between any two of these points,

or

(c) those points at which the pressure begins to rise more slowly - provided that a point at which the pressure begins to rise more rapidly exists between any two of these points.

Similar definitions are also to hold for the trough of a trace.

[2] The "mean slope" of a trace segment is defined to be a straight line drawn in such a way that it coincides as nearly as possible with the portion of the trace in question.

[3] It is realized that, in this case, there might be a reasonable doubt as to whether a "B" or a "G" characteristic should be chosen, i. e., as to whether the trace should be reported as "Rising, then rising more slowly" or as "Falling then rising". In this case, the question is tantamount to the question "Is the trace segment to be regarded as being composed of three parts - each part having an approximately constant slope - or is it to be regarded as being composed of two such parts?" This last question will be decided by the answer to the question: "Are there two points of discontinuity in the slope of the trace, or is there only one?" Roughly, it may be said that if, by extending the earlier part of the trace at any point, an angle is formed with the trace's continuation which is greater than one-sixth of a right angle, this point will be regarded as a point of discontinuity in the trace's slope. Since, in the trace segment in question there are two points at which such an angle exists, there are, then, said to be two slope discontinuity points and the segment is, accordingly, given a "B" characteristic.

4/ In addition to this, the limit "one-sixth of a right angle",which was used in footnote 3 for determining the number of points of discontinuity in slope of a given trace segment must be changed to one-fourth of a right angle.

W. R. Gregg,
Chief of Bureau.